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सादे बेयरिंग — सादे बेयरिंग और लपटे हुए बुशों के लिए वाशर — विशिष्ट

भाग 1 छल्लेदार प्रणोद वाशर

(पहला पुनरीक्षण)

Indian Standard

PLAIN BEARINGS — WASHERS FOR PLAIN BEARINGS AND WRAPPED BUSHES — SPECIFICATION

PART 1 RING TYPE THRUST WASHERS

(First Revision)

UDC 621·882·4 : 621·822·1

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

September 1992 **Price Group 3**

FOREWORD

This Indian Standard (Part 1) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Plain Bearings Sectional Committee had been approved by the Light Mechanical Engineering Division Council.

The standard was originally published in 1981. The present revision has been necessitated to align with the international standard ISO 6525 : 1983. Requirement of thrust half washers would be covered separately in Part 2 which is under preparation.

This standard covers ring type thrust washers and is in conformity with ISO 6525 : 1983 'Plain bearings — Ring type thrust washers made from strip — Dimensions and tolerances', issued by the International Organization for Standardization (ISO).

Indian Standard

PLAIN BEARINGS — WASHERS FOR PLAIN BEARINGS AND WRAPPED BUSHES — SPECIFICATION

PART 1 RING TYPE THRUST WASHERS

(First Revision)

1 SCOPE

This standard (Part 1) specifies a range of thrust washers for general purpose used with plain bearings and wrapped bushes. It applies to thrust washers having inside diameters from 6 to 80 mm.

2 DEFINITION

2.1 Ring Type Thrust Washer

An unsplit ring, normally fitting into a recess in the end of a housing, which is intended to accept thrust and to provide axial location for a rotating shaft (*see* Fig. 1). The standardized thrust washers are prevented from rotating by a dowel. Other means of location may be provided for special purpose.

3 SYMBOLS

D = outside diameter of the washer

d = inside diameter of the washer

e_T = total washer thickness

C = pitch circle diameter for dowel centre

F = dowel hole diameter

D_R = diameter of recess in the housing

e_R = depth of recess in the housing

p = flatness limit

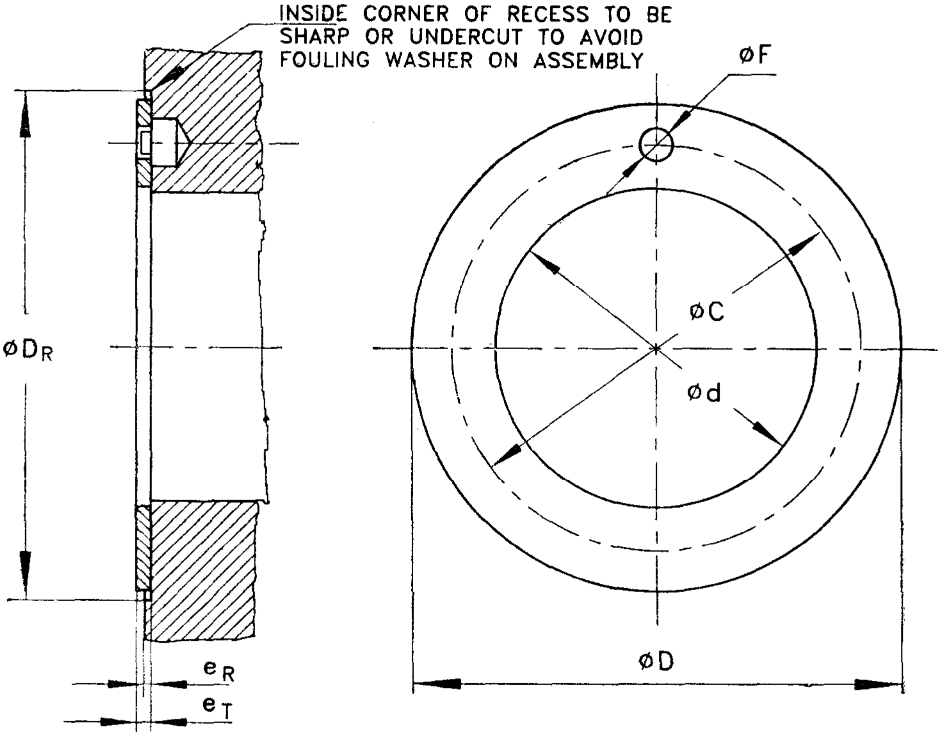
INSIDE CORNER OF RECESS TO BE SHARP OR UNDERCUT TO AVOID FOULING WASHER ON ASSEMBLY
ØF
ØDR
ØC
Ød
ØD
eR
eT

FIG. 1 THRUST WASHER

4 DIMENSIONS AND TOLERANCES

The basic dimensions and tolerances for thrust washers are given in Table 1. Dimension D_R is equal to D and the tolerance for D_R is G10. Dimensions e_R is determined by the possible wear of the thrust washer and by the condition of loading in order to prevent washer escaping out of the recess if the load is reversed.

5 OIL GROOVES

5.1 By agreement between the user and the manufacturer, oil grooves mav be provided.

5.2 Grooves serve the primary purpose of feeding oil over the flat areas. Sometimes, however, grooves have to be deeper than is necessary for this purpose in order to allow escape of oil from pressure-fed journal bearings. Some typical grooving arrangements are illustrated in Fig. 2.

5.2.1 When grooves are embossed into bimetallic materials, the depth of groove should preferably be less than the lining thickness.

5.2.2 Sharp edges of grooves shall be removed.

6 FLATNESS OF WASHER

It is not possible to specify flatness for thrust washers having oil grooving on the thrust face since the grooving operation causes distortion. In the special case of ungrooved washers, they shall slide between parallel plates set at $e_{T\max} + p$ where $p = 0{\cdot}10$ mm for up to 80 mm outside diameter and at $p = 0{\cdot}12$ mm above this diameter.

7 CHAMFERS

All sharp edges shall be removed.

8 MATERIAL

Materials for thrust washer lining and for steel backing shall be as given in Annex A and Annex B.

9 WORKMANSHIP AND FINISHING

All sharp edges shall be removed. Cracks in the lining material in the groove areas mav be allowed but no loose material shall be permitted.

10 MARKING

10.1 Ring type thrust washers shall be clearly marked with internal dia, wall thickness, original/repair size, manufacturer's trade mark and number of this standard.

Example

Ring type thrust washer IS 9764 (Part 1) —
30 × 1·5 RSO

where 30 is inside dia
1·5 is nominal thickness
RSO is original size

10.2 Each oversized thickness of thrust washers shall be marked with the amount of oversize in the following manner:

.1, .2, .3, etc.

Alternatively, RS I, RS II, RS III, etc ('RS' represents repair size)

Table 1 Dimensions and Tolerances

(*Clause* 4)

All dimensions in millimetres.

Nominal Bush Housing Diameter		Inside Diameter d $+0·25$ 0	Outside Diameter D 0 $-0·25$	Thickness e_T 0 $-0·05$	Pitch Circle Diameter C $\pm 0·15$	Dowel Hole Diameter F $+0.40$ $+0·10$
Preferred	Non-preferred					
6		6	16	1·00	11	1·5
7		7	17	1·00	12	1·5
8		8	18	1·00	13	1·5
9		9	19	1·00	14	1·5
10		10	22	1·00	16	1·5
11		12	24	1·50	18	1·5
12		12	24	1·50	18	1·5
13		14	26	1·50	20	2·0
14		14	26	1·50	20	2·0
15		16	30	1·50	23	2·0
16		16	30	1·50	23	2·0
17		18	32	1·50	25	2·0
18		18	32	1·50	25	2·0
19		20	36	1·50	28	3·0
20		20	36	1·50	28	3·0
21		22	38	1·50	30	3·0
22		22	38	1·50	30	3·0
	23	24	42	1·50	33	3·0
24		24	42	1·50	33	3·0
25		26	44	1·50	35	3·0
26		26	44	1·50	35	3·0
	27	28	48	1·50	39	4·0
28		28	48	1·50	39	4·0
30		32	54	1·50	43	4·0
32		32	54	1·50	43	4·0
34		36	60	1·50	48	4·0
36		36	60	1·50	48	4·0
38		40	64	1·50	52	4·0
	39	40	64	1·50	52	4·0
40		40	64	1·50	52	4·0
42		45	70	1·50	57·5	4·0
	44	45	70	1·50	57·5	4·0
45		45	70	1·50	57·5	4·0
48		50	76	2·00	63	4·0
50		50	76	2·00	63	4·0
53		55	80	2·00	67·5	5·0
	55	55	80	2·00	67·5	5·0
56		60	90	2·00	75	5·0
	57	60	90	2·00	75	5·0
60		60	90	2·00	75	5·0
63		65	100	2·00	83·5	5·0
	65	65	100	2·00	83·5	5·0
67		70	105	2·00	88	5·0
	70	70	105	2·00	88	5·0
71		75	110	2·00	92·5	5·0
75		75	110	2·00	92·5	5·0
80		80	120	2·00	100	5·0

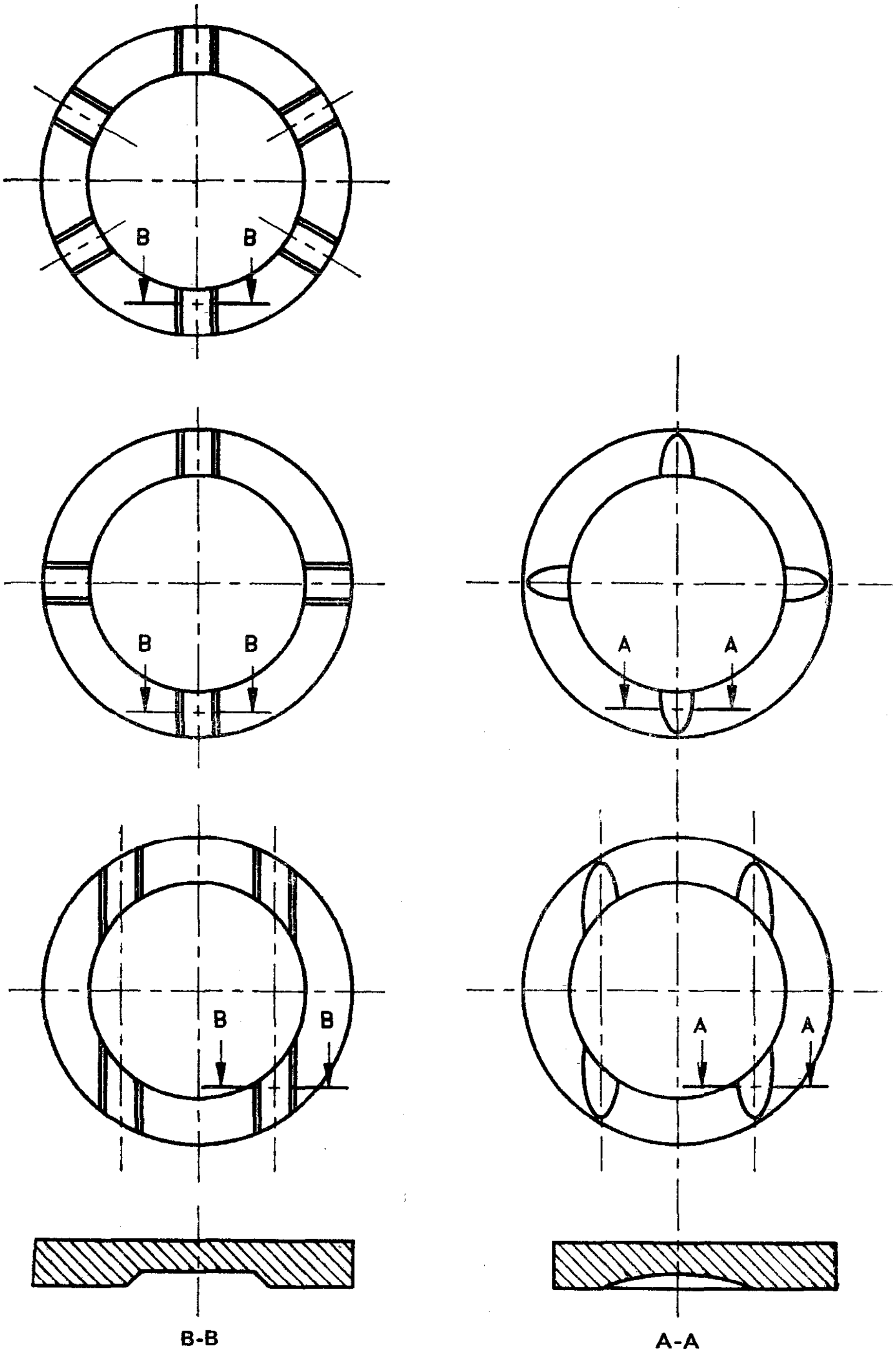

FIG. 2 TYPICAL OIL GROOVES

ANNEX A

(*Clause* 8)

BEARING MATERIAL FOR THRUST WASHER LININGS

Linings	*Approximate Percentage of*						
	Sn	Sb	Cu	Pb	As	Fe	
Tin-Based White Metal							
i) Sn Sb8 Cu4	88-90	7-8	3-4	0·35 *Max*	0·1 *Max*	0·1 *Max*	
Lead-Based White Metal							
i) Pb Sb10 Sn6	5-7	9-11	0·7 *Max*	80-86	0·25 *Max*	0·1 *Max*	
ii) Pb Sb15 Sn10	9-11	14-16	0·7 *Max*	71-77	0·6 *Max*	0·1 *Max*	
iii) Pb Sb15 Sn15	0·9-1·7	13·5-15·5	0·7 *Max*	80-84	0·8 1·2		
Copper-Based Alloys							
i) Cu Pb30	0·5 *Max*	—	R*	26-33	—	—	
ii) Cu Pb24 Sn4	3-4·5	—	R*	19-27	—	—	
iii) Cu Pb8 Sn4	3·5-4·5	—	R*	7-9	—	—	
iv) Cu Pb10 Sn10	9-11	—	R*	9-11	—	—	
Aluminium Based Alloys							
	Al	Cu	Sn	Ni	Fe	Si	Mn
i) Al Sn20 Cu	R*	0·7-1·3	17·5-22·5	0·1 *Max*	0·7† *Max*	0·7† *Max*	0·7† *Max*
ii) Al Sn6 Cu	R*	0·7-1·3	5·5-7	1·3	0·7† *Max*	0·7† *Max*	0·7† *Max*

*R = Remainder.

†Total Si + Fe + Mn not to exceed 1 percent.

ANNEX B

(*Clause* 8)

MATERIALS FOR STEEL BACKINGS

Aluminium based and white-metal alloys

Cold rolled, bright annealed, free from surface defects, such as pits, roaks, laps and internal laminations:

Chemical Analysis	*Percent*
Carbon	0·12 *Max*
Manganese	0·5 *Max*
Silicon	0·35 *Max*
Sulphur	0·05 *Max*
Phosphorus	0·05 *Max*

Hardness

Hardness (HV 10)	100-120 VPN

Copper based alloys

Colled rolled, free from surface defects, such as pits, roaks, laps and internal laminations:

Chemical Analysis	*Percent*
Carbon	0·15 *Max*
Manganese	0·7 *Max*
Silicon	0·35 *Max*
Sulphur	0·05 *Max*
Phosphorus	0·05 *Max*

Hardness

Hardness (HV 10)	170-210 VPN

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